Implement Inter-VLAN Routing

LAN Switching and Wireless – Chapter 6

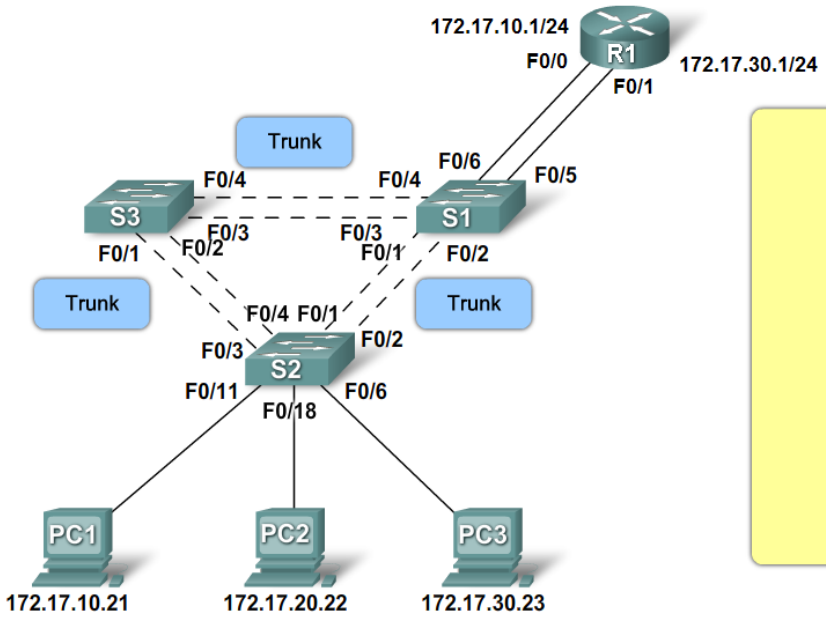
Objectives

- Explain to the satisfaction of a qualified instructor how network traffic is routed between VLANs in a converged network.
- Configure inter-VLAN routing on a router to enable communications between end-user devices on separate VLANs
- Troubleshoot common inter-VLAN connectivity issues.

Explain How Network Traffic is Routed Between VLANs in a Converged Network

- Describe the routing options between VLANs

Traditional Inter-VLAN Routing

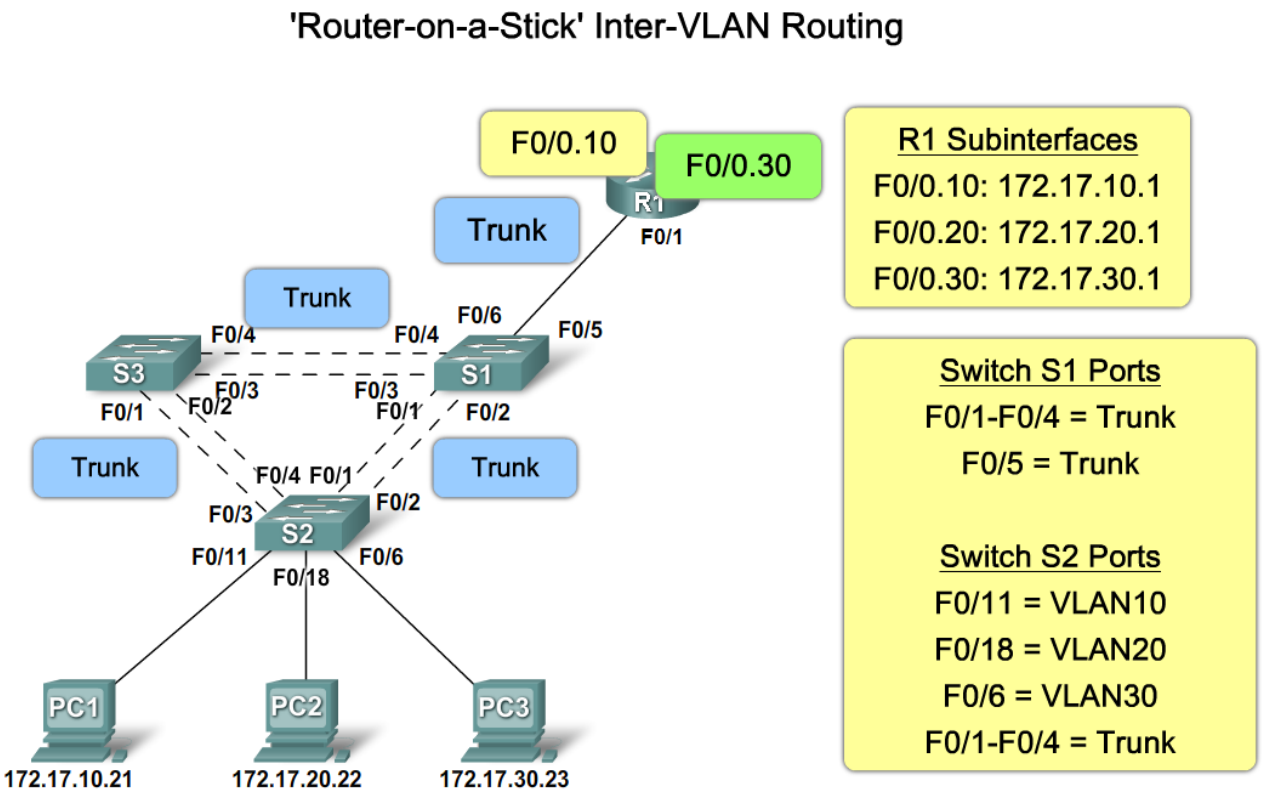


Switch S1 Ports
F0/6 = VLAN10
F0/5 = VLAN30
F0/1-F0/4 = Trunk

Switch S2 Ports
F0/11 = VLAN10
F0/18 = VLAN 20
F0/6 = VLAN30
F0/1-F0/4 = Trunk

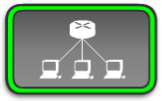
Explain How Network Traffic is Routed Between VLANs in a Converged Network

- Describe the role of interfaces and subinterfaces in supporting inter-VLAN routing

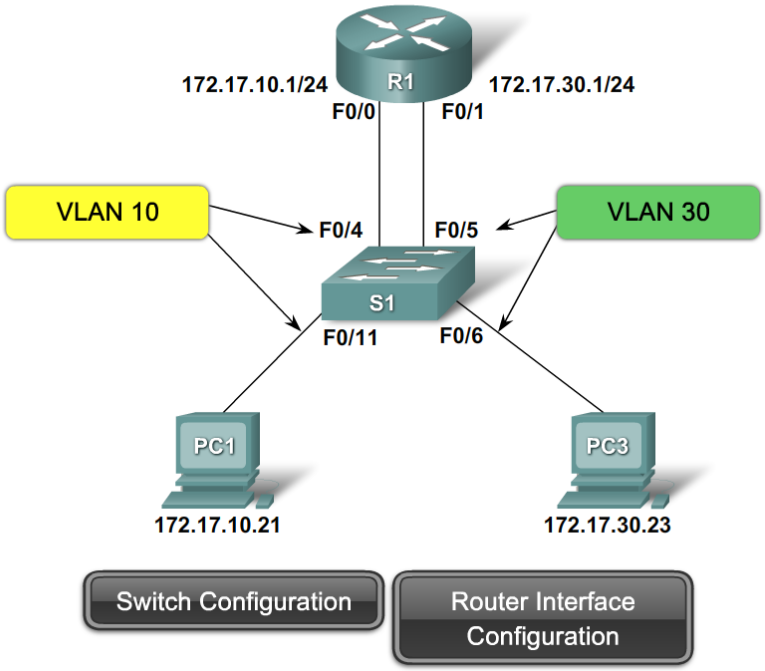


Configure Inter-VLAN Routing

- Describe the steps to configure inter-VLAN routing



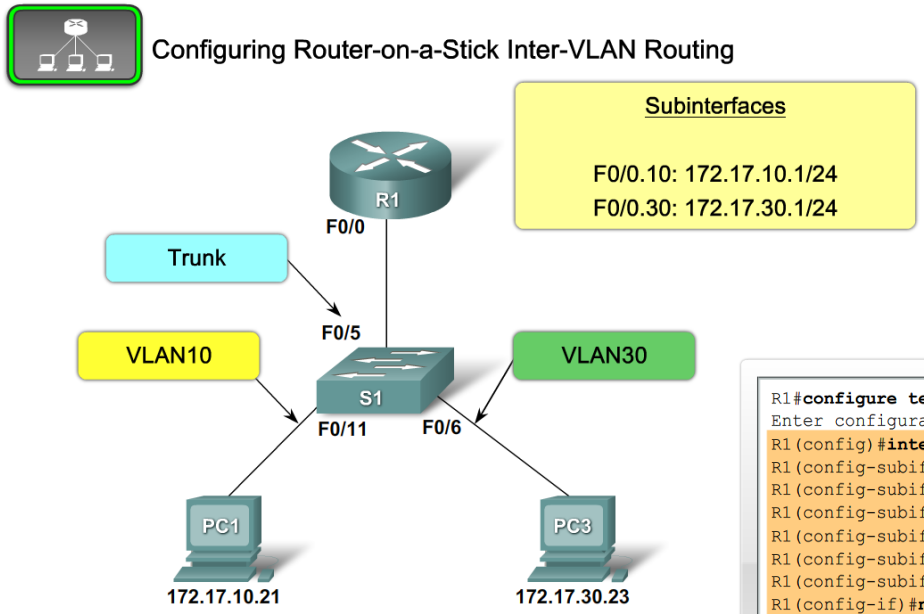
Configuring Traditional Inter-VLAN Routing




```
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface f0/0
R1(config-if)#ip address 172.17.10.1 255.255.255.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
R1(config-if)#interface f0/1
R1(config-if)#ip address 172.17.30.1 255.255.255.0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1,
changed state to up
R1(config-if)#end
R1#copy running-config startup-config
```

Configure Inter-VLAN Routing

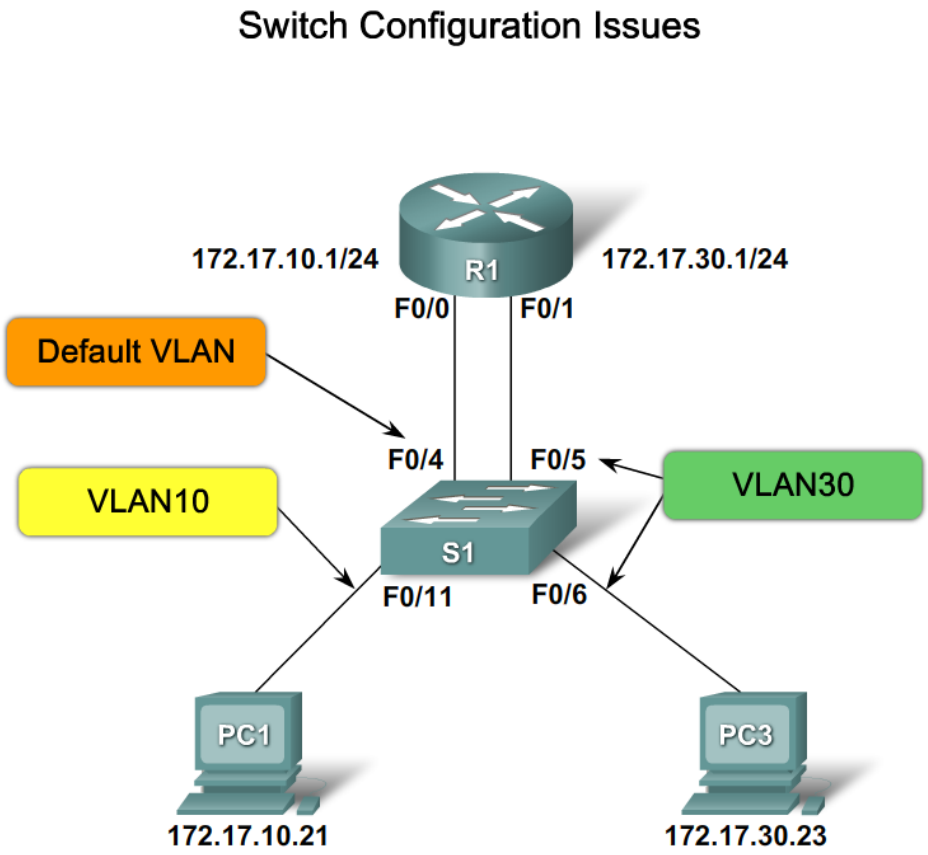
- Describe the steps to configure inter-VLAN routing




```
R1#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
R1(config)#interface f0/0.10
R1(config-subif)#encapsulation dot1q 10
R1(config-subif)#ip address 172.17.10.1 255.255.255.0
R1(config-subif)#interface f0/0.30
R1(config-subif)#encapsulation dot1q 30
R1(config-subif)#ip address 172.17.30.1 255.255.255.0
R1(config-subif)#interface f0/0
R1(config-if)#no shutdown
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0,
changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.10, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.10,
changed state to up
%LINK-5-CHANGED: Interface FastEthernet0/0.30, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0.30,
```

Troubleshoot Common Inter-VLAN Connectivity Issues

- Describe the common switch configuration Issues



Troubleshoot Common Inter-VLAN Connectivity Issues

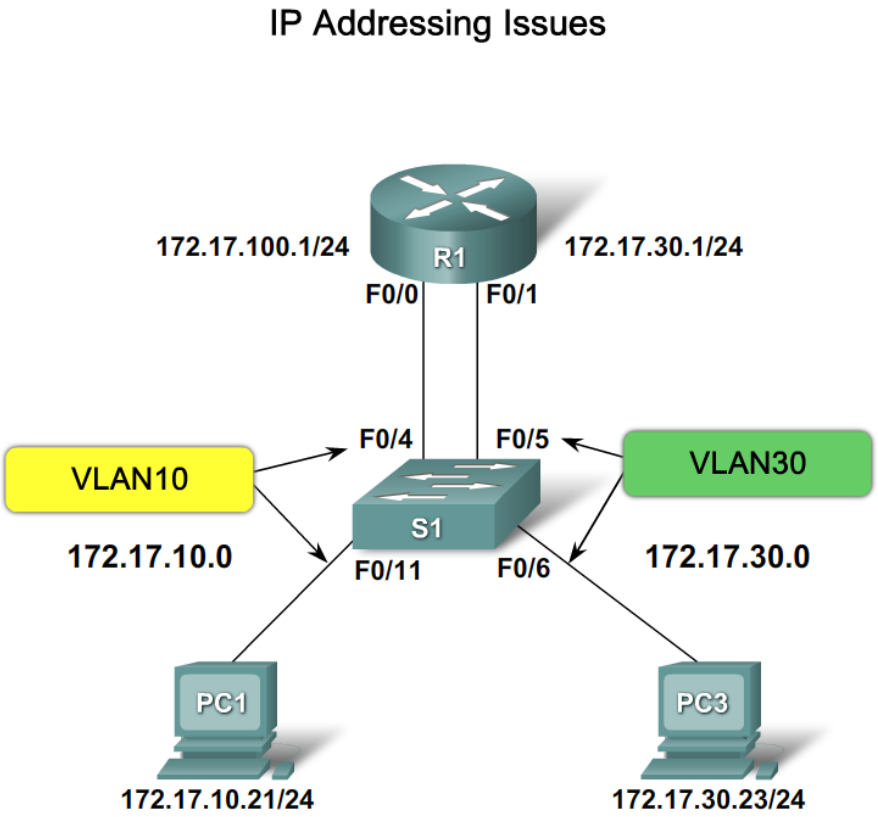
- Describe the common router configuration issues

Verify Router Configuration

```
R1#show interface
<output truncated>
FastEthernet0/0.10 is up, line protocol is down (disabled)
  Encapsulation 802.1Q Virtual LAN, Vlan ID 100
  ARP type: ARPA, ARP Timeout 04:00:00,
  Last clearing of "show interface" counters never
<output truncated>
R1#
R1#show run
Building configuration...
Current configuration : 505 bytes
<output truncated>
!
interface FastEthernet0/0.10
 encapsulation dot1Q 100
 ip address 172.17.10.1 255.255.255.0
!
interface FastEthernet0/0.30
```

Troubleshoot Common Inter-VLAN Connectivity Issues

- Describe the common IP Addressing Issues



Summary

- Inter-VLAN routing is the process of routing information between VLANs
- Inter-VLAN routing requires the use of a router or a layer 3 switch
- Traditional inter-VLAN routing

  Requires multiple router interfaces that are each connected to separate VLANs

Summary

- Router on a stick

  this is an inter-VLAN routing topology that uses router sub interfaces connected to a layer 2 switch.

  Each Subinterface must be configured with:

  An IP address

  Associated VLAN number

- Configuration of inter VLAN routing

  –Configure switch ports connected to router with correct VLAN

  –Configure each router subinterface with the correct IP address & VLAN ID

- Verify configuration on switch and router